APPLICATION FOR UNITED STATES LETTERS PATENT

For

A METHOD AND APPARATUS FOR DOING PROGRAM ANALYSIS

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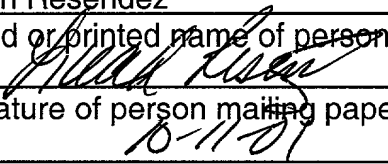Los Angeles, CA 90025-1026
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A METHOD AND APPARATUS FOR DOING PROGRAM ANALYSIS

FIELD OF THE INVENTION

[0001]   This invention relates to program analysis. In particular, it relates to program analysis in optimizing compilers.

BACKGROUND

[0002]   Many program analysis problems involve propagating abstract values, which are compile-time approximations of the actual values computed by a program. A convenient structure for doing program analysis includes a dependence flow graph wherein nodes in the graph represents statements in the program and there is an edge from each statement that defines (writes) a storage location to a statement that uses (reads) the storage location. When there are many definitions and uses of a storage location, the number of edges in such a dependence flow graph becomes large relative to the number of nodes. This affects both the storage and time required to perform a program analysis using the graph.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] **Figure 1** shows a schematic drawing of an optimizing compiler in which embodiments of the invention may be practiced;

[0004] **Figure 2** shows a schematic drawing of a dependence flow graph constructed in accordance with one embodiment of the invention;

[0005] **Figure 3** shows a flowchart of a method for constructing a dependence flow graph according to one embodiment of the invention;

[0006] **Figure 4** shows an algorithm for doing a value propagation program analysis according to one embodiment of the invention; and

[0007] **Figure 5** shows a schematic drawing of hardware for performing program analysis in accordance with the invention.